Electronic Version
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Claims

[c1] 1.A method for reducing amplitude mismatch and phase mismatch in quadrature signals in an RF receiver, wherein the quadrature signals comprises a first signal and a second signal that are at about quadrature phase angles, the method comprises:
modifying the second signal by a portion of the first signal so that a phase difference between the modified second signal and the first signal becomes substantially close to 90 degrees; and
modifying amplitudes of the first signal and the second signal to substantially the same values.

[c2] 2.The method of claim 1 further comprising:
compensating a portion of the first signal to the second signal to reduce phase mismatch in the pair of quadrature signals.

[c3] 3.The method of claim 1 further comprising:
adjusting amplitudes of the first signal and the second signal to the same value to reduce amplitude mismatch in the pair of quadrature signals.

[c4] 4. A method used in an RF receiver for reducing an im-

age cross talk, the RF receiver comprising:
a first mixer and a second mixer for receiving RF signals and respectively generating a first signal and a second signal that are at about quadrature phase angles;
an amplitude calibration module coupled to at least one of the first mixer and the second mixer, for reducing amplitude mismatch in the pair of quadrature signals when the amplitude mismatch causes the image cross talk; and
a programmable phase calibration device coupled to the pair of mixers for reducing phase mismatch in the pair of quadrature signals when the phase mismatch causes the image cross talk;
the method comprising:
utilizing the pair of mixers to process the RF signal and to output the pair of quadrature signals;
utilizing the programmable amplitude calibration device to reduce the amplitude mismatch in the pair of quadrature signals; and
utilizing the programmable phase calibration device to reduce the phase mismatch in the pair of quadrature signals, wherein two ports of the programmable phase calibration device are respectively connected to two output ports of the pair of mixers.

[c5] 5.The method of claim 4 further comprising:

utilizing the programmable phase calibration device to compensate a portion of the first signal to the second signal so that phase difference between the compensated second signal and the first signal becomes 90 degrees.

[c6] 6.The method of claim 4 further comprising:
utilizing the programmable amplitude calibration device to adjust amplitudes of the first signal and the second signal to the same value.

[c7] 7.A low-IF receiver comprising:
a first mixer and a second mixer for receiving RF signals and respectively generating a first signal and a second signal that are at about quadrature phase angles;
an amplitude calibration module coupled to at least one of the first mixer and the second mixer, for adjusting the amplitude of at least one of the first signal and the second signal so as to make the amplitude of the first signal and the second signal substantially equal; and
a phase calibration module coupled to at least one of the first mixer and the second mixer, for combining a portion of the first signal with the second signal so as to make the phase difference of the first signal and the second signal substantially equal to 90 degrees.

[c8] 8.The low-IF receiver of claim 7 wherein the amplitude

calibration module further comprises:
a first amplitude calibration device coupled to the first mixer; and
a second amplitude calibration device coupled to the second mixer.

[c9] 9.The low-IF receiver of claim 7 wherein the phase calibration module further comprises a phase calibration device coupled between the first mixer and the second mixer.

[c10] 10.The low-IF receiver of claim 7 further comprising an analog front end controller (AFE controller) coupled to and controlling the amplitude calibration module and the phase calibration module so as to make the amplitude of the first signal and the second signal substantially equal and make the phase difference of the first signal and the second signal substantially equal to 90 degrees.

[c11] 11.The low-IF receiver of claim 7 wherein the amplitude calibration module compriese a programmable gain amplifier (PGA).

[c12] 12.The low-IF receiver of claim 7 wherein the phase calibration module comprises a cross programmable gain amplifier (XPGA).

[c13] 13. The low-if receiver of claim 7 being applied in a GSM

communications system or a WLANcommunications system.